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(54) WATERPROOFING AND WEATHERPROOFING SYSTEMS

(71) We, PERMANITE LIMITED, a British Company, of Lea Road, Waltham Abbey, Essex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the waterproofing and weatherproofing of structures such as roofs, and in particular to the use at edge and other details, and at joints under mastic asphalt roofing and between preformed weatherproofing elements such as bitumen felts and boards, of a preformed tacky and malleable strip of an adhesive material. The latter, prevented from self-adhesion in the roll by a release sheet, can be laid and bonded by its exposed surface to one substrate, and the release sheet then removed to expose the other face for completion of the joint or detail. The invention also concerns roofs and roofing details obtained by use of the adhesive strip.

According to the invention there is provided a preformed waterproof membrane of a bitumen/polymer composition having adhered over at least a portion of a face thereof one face of a preformed tacky and malleable strip of an adhesive material whose other face is covered by a release sheet. The membrane and adhesive strip may be in strip form and used to cover and seal joints between adjacent weatherproof sheets or roof deck boards or slabs, or the membrane may be the primary weatherproof sheet provided with the adhesive strip for sealing to an adjacent sheet.

For example, to obtain a watertight lap joint seal between adjacent waterproofing sheets or membranes of bitumen/polymer composition in a single layer waterproofing system, a first waterproofing sheet or membrane already laid on the deck or other surface to be waterproofed has the adhesive strip applied along its edge which is to be lap jointed with the next sheet or membrane; the adhesive strip will be applied from the roll with its release sheet exposed, for example by means of a hand roller. The release sheet is then removed and the adjacent waterproofing sheet or membrane is lapped over the said edge by the width of the adhesive strip to effect the lap joint seal between the two sheets or membranes, the overlapping edges for example being rolled with the roller to ensure a strong and waterproof bond.

Suitable waterproofing membranes for lap jointing in this manner are for example as described in U.K. Patents Nos. 1,271,233, 1,400,636 and 1,400,821. For this application, a suitable width for the adhesive strip would for example be about 50 mm.

In single layer waterproofing systems, of the type mentioned above, difficulties can also arise at cross joints, where adjacent sheets have to be jointed end to end as well as side by side, due to the steps formed at the overlaps.

A cross joint can be formed according to the invention by first laying on the deck a sheet or strip of the waterproofing membrane and applying thereto two spaced adhesive strips on either side of and generally longitudinally of (preferably parallel to) the end to end joint that is to be formed. The adhesive strips may be applied, release sheet exposed, in the manner described above. The edges of the two portions to be jointed, preferably after trimming to a straight line, are lapped one over each adhesive strip after removal of the release paper, each edge projecting loose beyond its adhesive strip towards the other. These loose edge portions are then sealed down onto the underlying sheet or strip of waterproof membrane, e.g. using a cold applied bitumen adhesive. A partially complete joint of this type is indicated in the drawing accompanying the provisional specification in which 2 is the initially laid waterproof membrane, suitably about ½ m wide, 4 are the two adhesive strips applied along its edges, 6 are the two members to be jointed, each already formed from several sheets 8 lap jointed at 10, and 12 is the cold applied bitumen adhesive by which the members 6 have their loose edges bonded to membrane 2; each adhesive strip is suitably about 50 mm wide, the loose edges of members 6 projecting beyond each strip being for example about 150 mm wide. A full

width of high performance roofing felt can then be fully bedded over the said edges of the two members 6, again using cold applied bitumen adhesive.

For other applications the membrane and adhered adhesive strip may be in strip form; for example such a strip in which membrane and adhesive strip are co-extensive can be used to seal a butt joint between adjacent weatherproof membranes laid on a roof decking. The release sheet is removed and the membrane strip adhered to the adjacent weatherproof membranes along the joint by way of the exposed adhesive strip.

In another strip form the strip or sheet of waterproof material has the adhesive strip applied to one face along both of its opposed long edges. Such a strip can for example be used as a flexible flashing at joins between a roof deck and a parapet wall or chimney and at other roof edge details, or as described further below, for an expansion joint under mastic asphalt. When the flashing is applied on site, the release sheets are removed to expose the adhesive strips, and one edge of the sheet is adhered to the wall or chimney or other upstand and the other edge will be bonded to the deck. Additional systems can then be applied over the deck area, and a flexible edge detail is thus formed. A capping or trim will preferably be provided at the upper edge to shed water that comes down the upstanding face. A suitable flashing sheet is for example about 300 mm wide, with each adhesive strip about 50 mm wide.

As indicated above, at edge details a trim or capping is preferably employed to finish the edge on the upstanding face. The trim may be attached to the upstanding surface, and have a portion which overhangs and/or overlaps the outer surface of the top edge of the weatherproofing material. Such trims are available under the Trade Mark "Permatrim". In the latter type of trim, where a surface of the trim is to adhere to or engage the waterproof covering, the said surface of the trim according to the present invention has the adhesive strip applied thereto so that on removal of the release sheet a self-adhesive edge is presented.

The adhesive strip can also be employed according to the invention in pre-weatherproofed board roofing systems, in which an edge or two adjacent edges of each board has or have an overlap of weatherproofing material of bitumen/polymer composition; the boards are fixed into position so that each join between adjacent boards is covered by a said overlap, thus providing a watertight cover. According to the invention each board has an edge or two adjacent edges with an overlap of weatherproofing material as before, and the opposite edge or edges (which after installation will be overlapped by the overlapping weatherproofing of adjacent boards) has or have the adhesive strip applied therealong. When the boards are installed, the release sheets are rem ved and the overlapping material from adjacent boards is rolled nto the exposed adhesive strips to giv a seal.

Figures 1 and 2 of the accompanying drawings are exploded views illustrating the application of the invention to expansion joints under mastic asphalt, Figure 1 showing a horizontal detail, and Figure 2 a vertical detail at an upstand, e.g. at a parapet wall or the like.

Figure 1 shows a portion of a flat roofing system having a concrete deck formed by spaced slabs 20 laid on supporting beams (not shown). An expansion joint is formed at the gap 22 between adjacent blocks by means of a membrane and adhesive strip according to the invention. This membrane and adhesive strip joint consists of a preformed strip 26 of bitumen/polymer composition having a preformed tacky and malleable strip 28 of self- and bitumen-adhesive material 28 adhered by one face along the opposed long edges thereof, the other adhesive face of each strip initially being covered with a release sheet. The surfaces 24 of the slabs bordering the gap 22 are first primed, suitably with a cold-applied bitumen adhesive, the release sheets are stripped from the adhesive strips 28, and the bitumen/polymer strip 26 is then laid over and along the gap 22 with one strip 28 adhered to the primed area 24 of each slab 20. The adhesive strips 28 bond the edges of the bitumen/polymer strip 26 firmly to each slab, the bitumen/polymer strip 26 being flexible and stretchable to accommodate movement of the slabs 20 to widen or narrow the slot 22. An isolating membrane 30, suitably of conventional fibre based bitumen felt, is then laid over the whole roof deck, and a layer 32 of mastic asphalt is then laid over the isolating membrane in conventional manner.

In Figures 1 and 2, like reference numerals indicate like parts, and Figure 2 illustrates a case where the gap 22 extends to and up an upstand such as a parapet wall 34. Here the bitumen/polymer strip 26 is bonded to the primed surfaces 24 on either side of gap 22 by the strips 28 in the same manner as in Figure 1. The isolating membrane 30 of Figure 1 does not however extend up the upstand; instead lathing, preferably of expanded metal 36 as illustrated, is placed over the bitumen/polymer sheet 26 and pinned to the upstand. A horizontal chase 38 is provided along the upstand for the tacking in of the mastic asphalt which is applied over the flat roofing and up the upstand, giving a neat and weatherproof finish; the lathing 36 provides a key for the mastic asphalt to assist its firm adherence to the upstand surface and over the expansion joint.

The waterproof, and preferably weatherproof, membrane of the membrane/adhesive strip combination according to the invention is preferably of a bitumen-modified polymer composition as described in the abov mentioned U.K. Patent Nos. 1,271,233, 1,400,636, and 1,400,821. Membranes of this type are commercially available under th Trade Mark "Permabit". An appropriate adhesive strip for use according to the invention is for example "strip adhesive SA6002" available from System Adhesives. The adhesive strip employed according to the invention is suitably of 1 mm gauge, and the membrane to which it is adhered by one face is suitably of 1.5 mm gauge. In the previously described embodiment where a butt joint between weatherproof sheets is sealed with a coextensive membrane/adhesive strip combination according to the invention, the adhesive strip and the membrane to which it is adhered by one face are suitably about 100 mm wide. In the embodiment illustrated in accompanying Figures 1 and 2, the bitumen/polymer strip 26 is suitably about 500 mm wide, with each adhesive strip 28 being about 50 mm wide.

WHAT WE CLAIM IS:—

1. A preformed waterproof membrane of a bitumen/polymer composition having adhered over at least a portion of a face thereof one face of a preformed tacky and malleable strip of an adhesive material whose other face is covered by a release sheet.

2. A membrane and adhesive strip according to claim 1 in which the adhesive strip is adhered along an edge of the membrane.

3. A membrane and adhesive strip according to claim 1 in which the membrane is in strip form and is substantially coextensive with the adhesive strip.

4. A membrane and adhesive strip according to claim 1 in which the membrane is in strip form and has said adhesive strip adhered to one face along both of its opposed long edges.

5. A method of forming a lap joint between adjacent waterproof membranes in which a membrane and adhesive strip according to claim 2 laid on a surface to be waterproofed with the release sheet exposed has said release sheet removed, and a second waterproof membrane is laid on the surface with an edge overlapping and adhered to the said other face of the adhesive strip.

6. A method according to claim 5 wherein the first membrane is laid on the surface and the adhesive strip is then adhered along an edge thereof.

7. A method of forming a joint between adjacent waterproof sheets in which the sheets are laid side-by-side on a surface to be waterproofed, the release sheet is removed from an adhesive strip and membrane according to claim 3 r 4, and the membrane is laid to straddle the butt j int or gap between the sheets and is adhered to the edges of the sheets along the joint or gap by means of the adhesive strip.

8. A roofing board having a weatherproof membrane of a bitumen/polymer compositi n adhered thereover with one edg f the membrane projecting from one edge of the board, the opposite edge of the membrane having adhered therealong one face of a preformed tacky and malleable strip of an adhesive material whose other face is covered with a release sheet.

9. A roofing board according to claim 8 wherein the weatherproof membrane projects from two adjacent edges of the board and has the adhesive strip adhered along its two opposed adjacent edges.

10. A method of forming an expansion joint at a gap between adjacent base slabs to be coated with a mastic asphalt layer, the method comprising removing the release sheets from a membrane and adhesive strip according to claim 4 in which the membrane is of stretchable material, laying the membrane along the gap with one adhesive strip adhered to each slab so that the membrane bridges the gap, and laying an isolating sheet over the membrane to maintain the membrane out of contact with mastic asphalt subsequently applied over the base slabs.

11. A method according to claim 10 including initially priming the slab surfaces adjacent the gap to improve adherence to the adhesive strips.

12. A method according to claim 10 or 11 wherein the slabs provide an upstand surface and lathing is disposed over the membrane and fixed to the upstand to provide a key for subsequently applied mastic asphalt.

13. A method according to claim 12 wherein the isolating sheet is omitted.

14. Roofing comprising roof decking covered with preformed weatherproof sheets of a bitumen/polymer composition, the sheets being adhered to the roof decking and adjacent sheets overlapping with sealed lap joints therebetween formed by a method according to claims 5 or 6.

15. Roofing comprising roof decking covered with butt-jointed preformed weatherproof sheets adhered to the decking, each butt joint being sealed by a method according to claim 7.

16. Roofing comprising a roof support have been covered by abutting boards according to claim 8 or 9 from which the release sheets have been removed, the or each projecting membrane edge of one board overlapping and adhering to the said other face of the corresponding adhesive strip of an adjacent board.

17. Roofing comprising a deck of spaced base slabs, a joint structure formed by a

method according to claim 10 or 11 between adjacent slabs, an isolating sheet covering the or each said membrane, and a continuous layer of mastic asphalt laid over the whole deck.

18. Roofing according to claim 17 in which the joint structure and mastic asphalt extend up an upstand, and lathing is fixed to the upstand and over the joint structure as a key for the mastic asphalt.

19. An expansion joint for mastic asphalt roofing, the expansion joint being substantially as hereinbefore described with reference to Figs. 1 and 2 of the accompanying drawings.

20. Roofing including preformed weatherproof sheets jointed and sealed substantially as hereinbefore described.

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1593071 COMPLETE SPECIFICATION
1 SHEET This drawing is a reproduction of the Original on a reduced scale

FIG.1

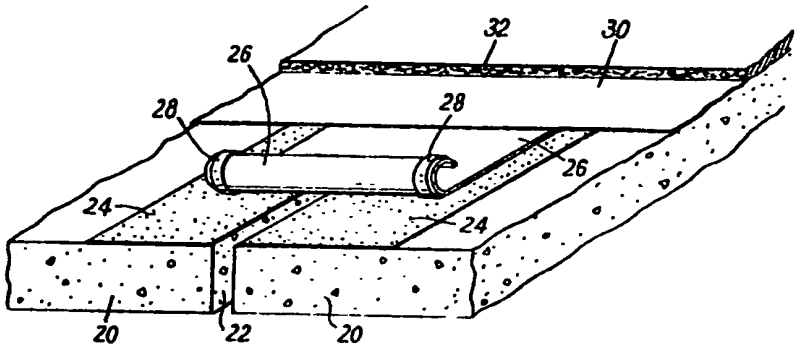

FIG.2